RESTRICTED CIRCULATION

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AGRICULTURAL MEMORANDUM No 531

Sequences of work days for grass conservation - Wales

D FORSDYKE

BACKGROUND

At a meeting at Trawscoed the need for planning data to assess the appropriate method of grass conservation in Wales was expressed.

DEFINITIONS

A "dry" day is taken to be one with a rainfall amount not greater than 0.01 in. A work day is defined as a dry day followed by various numbers of dry days for different methods of conservation.

The methods of conservation and their work day requirements are:

i) Direct cut silage - one work day

ii) Wilted silage - one work day followed by one dry day

iii) Barn hay - one work day followed by 2 dry days

iv) Quick hay - one work day followed by 3 dry days

v) Slow hay - one work day followed by 4 dry days

Since the object of the investigation was to compare the days available for the different methods, the analysis covered the whole season, stated to be mid-May to the end of September although at any particular time through the season any one method might be inappropriate for other reasons. The season was divided up into 14 consecutive 10 day periods from May 15 through October 1.

It is important to realise that the definition of a work day above gives no conflict in deciding the appropriate allocation to a particular 10 day period when a dry spell extends from one period to the next. Thus consider the following run of days where D represents a dry day and W a wet one:

..... W / D D W W W D D W D D / D D D W W D .....

The count of work days in the 5 classes for the above complete 10 day period is then:

i) 6 - number of 1 + 0 work days

ii) 4 - " " 1 + 1 " "

iii) 2 - " " 1 + 2 " "

iv) 2 - " " 1 + 3 " "

v) 1 - " " 1 + 4 " "

Providing one considers that the decision is made and the work is started on the

work day then a proper allocation to the successive 10 day periods can be made, and there is no difficulty in dealing with dry spells which overlap contiguous periods.

DATA

The basic data used in this analysis were computer printouts of daily (24 hour) rainfall totals for 29 rainfall stations in Wales for the 10 year period 1961-1970 inclusive. The data were complete for most stations but for a few, some was missing; where this amounted to only one year (or part year) a 9 year average was taken and exceptionally, for one or two stations where part season only data was missing in a second year, the loss of data for a short spell in any 2 years was accepted and an 8 year average used instead of the standard 10 year period. Stations not meeting these restrictions were not used.

RESULTS

Figures 1 through 5 show the average number of work days per 10 day period averaged over the season for each of the five categories. These may be considered as representing the overall geographical or spatial variation for Wales. Isopleths are drawn at intervals of 0.5 day. Note, that the patterns are similar and show some correspondence with the orography of Wales.

From the raw data it was clear that as well as a spatial variation, there is a marked variation during the season which is very similar at all stations and for all classes of work days. Figure 6 shows this variation of frequency of work days (all classes) as a fraction of the overall average.

A combination of the multiplying factor from Figure 6 with the geographical value from Figures 1 through 5 enables an estimate of the number of work days available to be made for any site in any 10 day period in the season.

As well as the average frequency of occurrence of work days it is important to have estimates of the number of years in 10 in which there is one or more occurrence of a work day in any 10 day period. The same approach has been used in presenting these estimates and Figures 7 through 11 show the geographical variation of numbers of years in 10 when there is one (or more) work day per 10 day period averaged over the season. Figure 12 shows the seasonal variation, again as a proportion of the overall average. The combination of the diagram and appropriate map allows an estimate of the number of years in 10 in which one or more work days can be expected in any 10 day period through the season.

It should be noted here that there were fewer stations used in producing Figures 7-11 than on 1-5, this is because reliable estimates of occurrences for missing data could not be made. However the patterns which emerge show consistency with the series of Figures 1-5 and the two diagrams for seasonal variation also show marked similarity.

DISCUSSION

Two things emerge from this work, the first is the very marked seasonal variation with a clear indication that the best time for grass conservation is early in the season - late May early June. Thereafter there are less marked fluctuations with a pronounced bad period late July through much of August. These two marked good and bad periods are in agreement with common or popular experience.

The second is the small number of days available for quick or slow hay over much of Wales. On the assumption that a particular method will only be advocated if

one can expect success in at least 7-8 years out of 10, then it appears that only methods (i), (ii) and (iii) are really viable over much of the area.

It should be noted that in this investigation no account has been taken of non-work days for other reasons, ie week-ends and public holidays. If these are rigidly adhered to then the days available will be reduced by about 2/7. A compensating factor in this is that the number of available days has probably been underestimated because of the criteria adopted. Thus in a spell of, say, 6 days, 5 of which are dry, one day with, say, .02 to .05 in. might cause a day's delay in the operation and a "1 + 4" work day would be available in practice. Also some light rain during the night or a passing shower would probably not prevent the operation being carried out with acceptable efficiency, but this cannot be allowed for when the basic data are 24 hour rainfall totals.

Any comments or suggestions on this paper should be sent to the author.

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February 1973

Average no. of "1+0" work days/10 day period
May 15 - Oct 1.

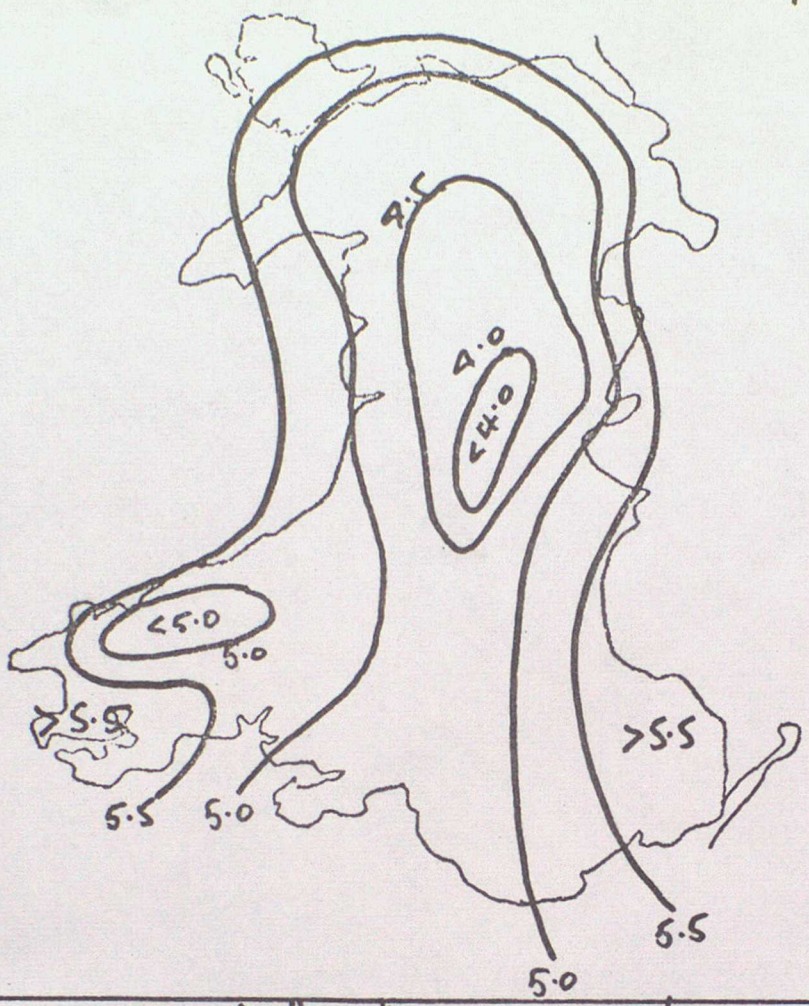


FIG 1.

Average no. of "1+1" work days/10 day period
May 15 - Oct 1.

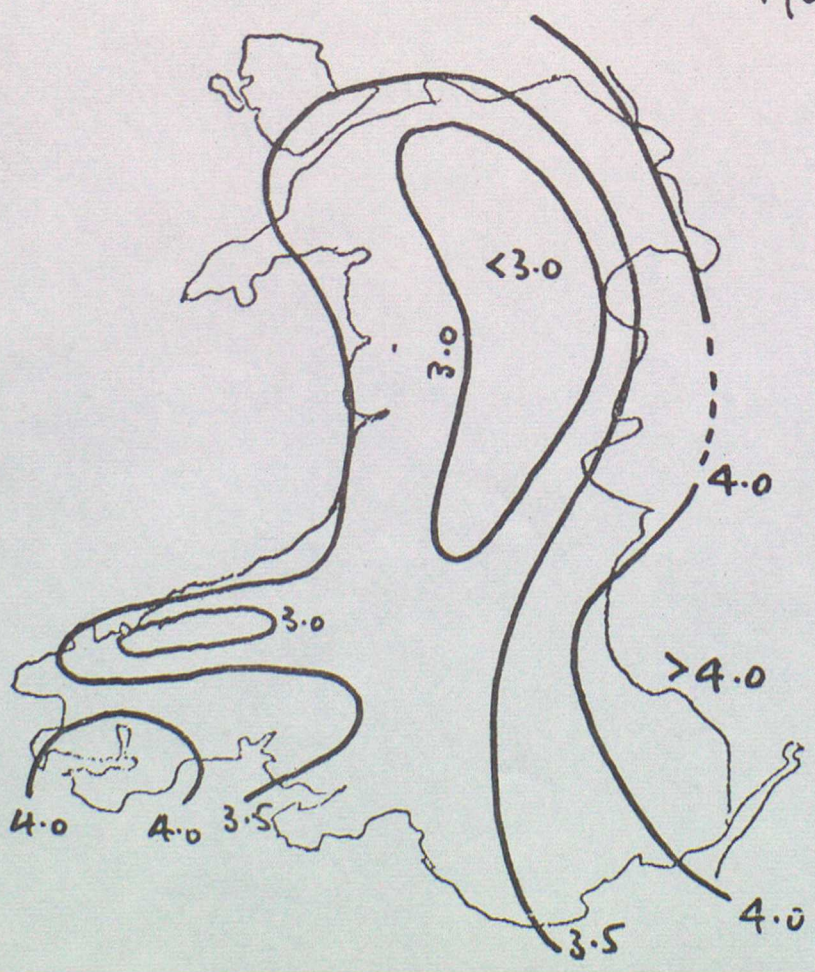


FIG 2

Average no. of "1+2" work days / 10 day period.
May 15 - Oct 1.

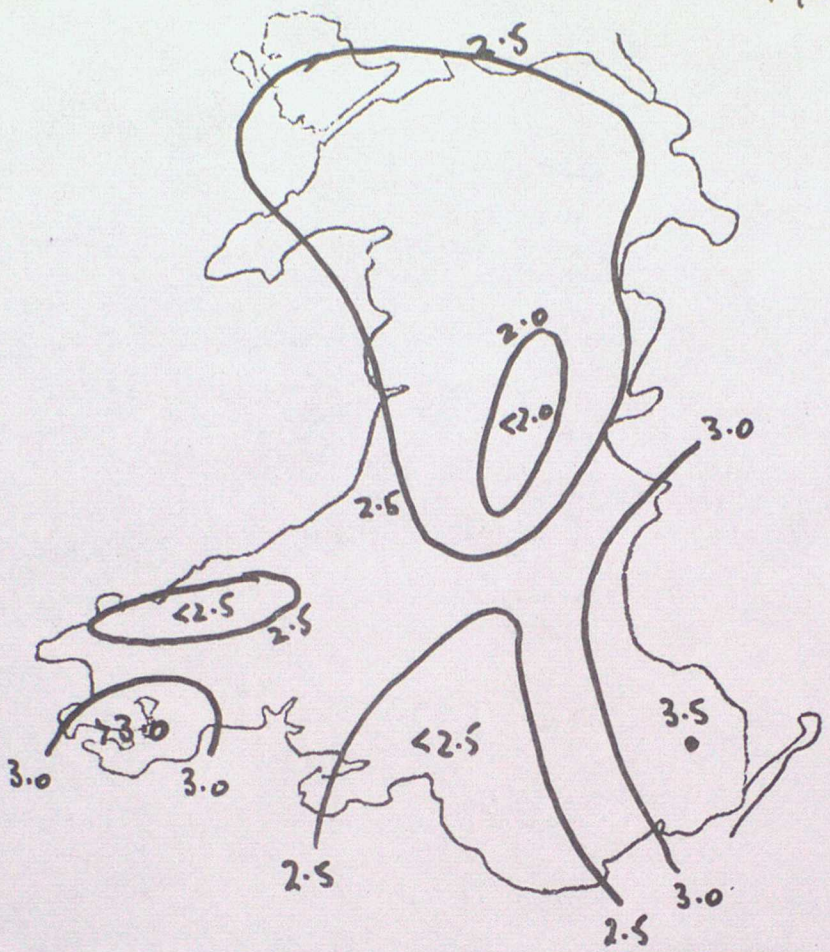


FIG 3

Average no. "1+3" work days / 10 day period
May 15 - Oct 1.

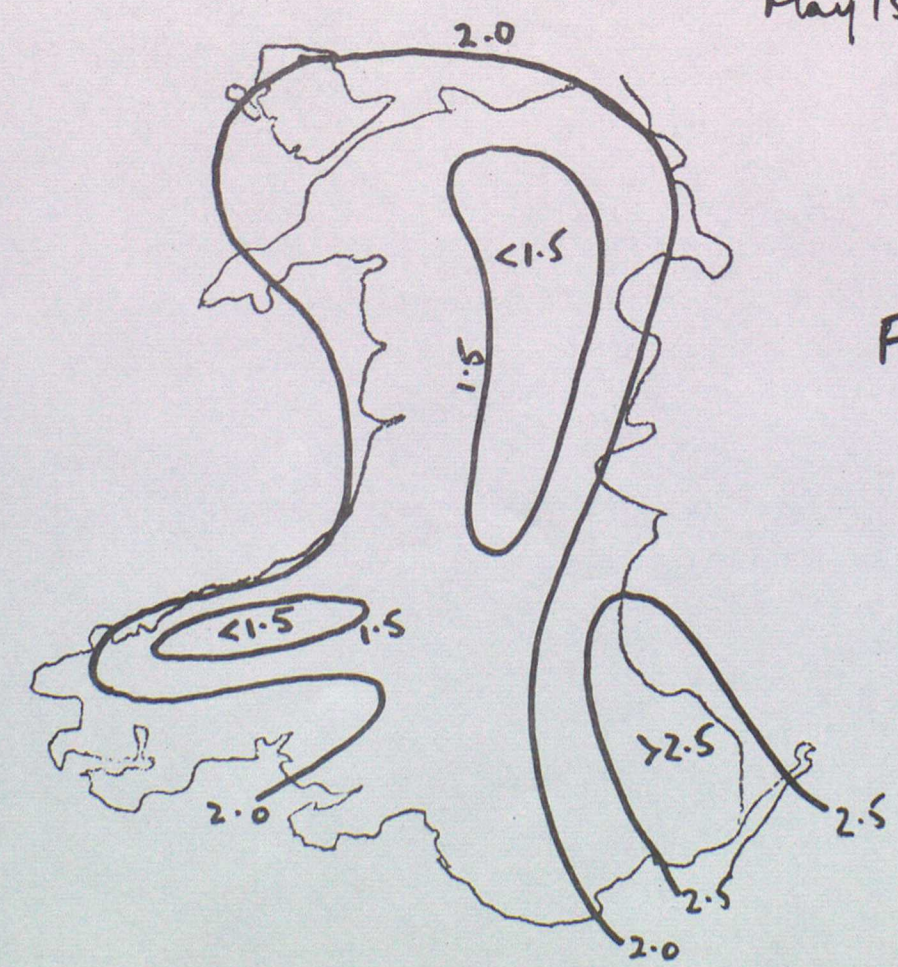


FIG 4

Average no. of "1+4" work days / 10 day period
May 15 - Oct 1.

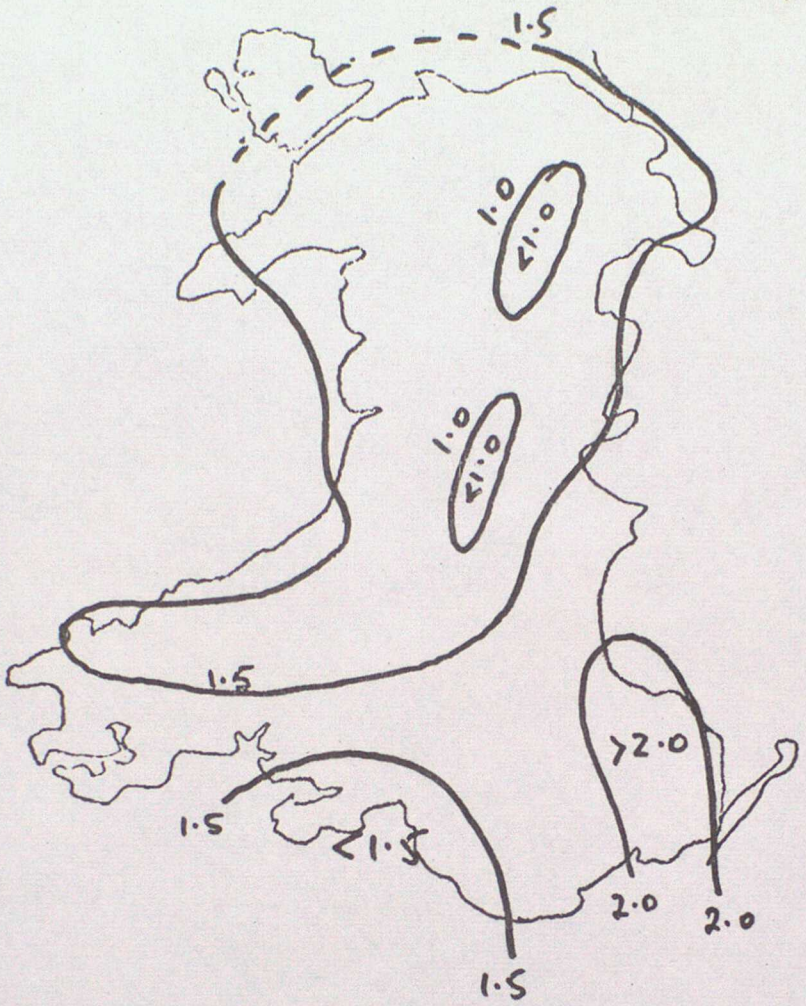
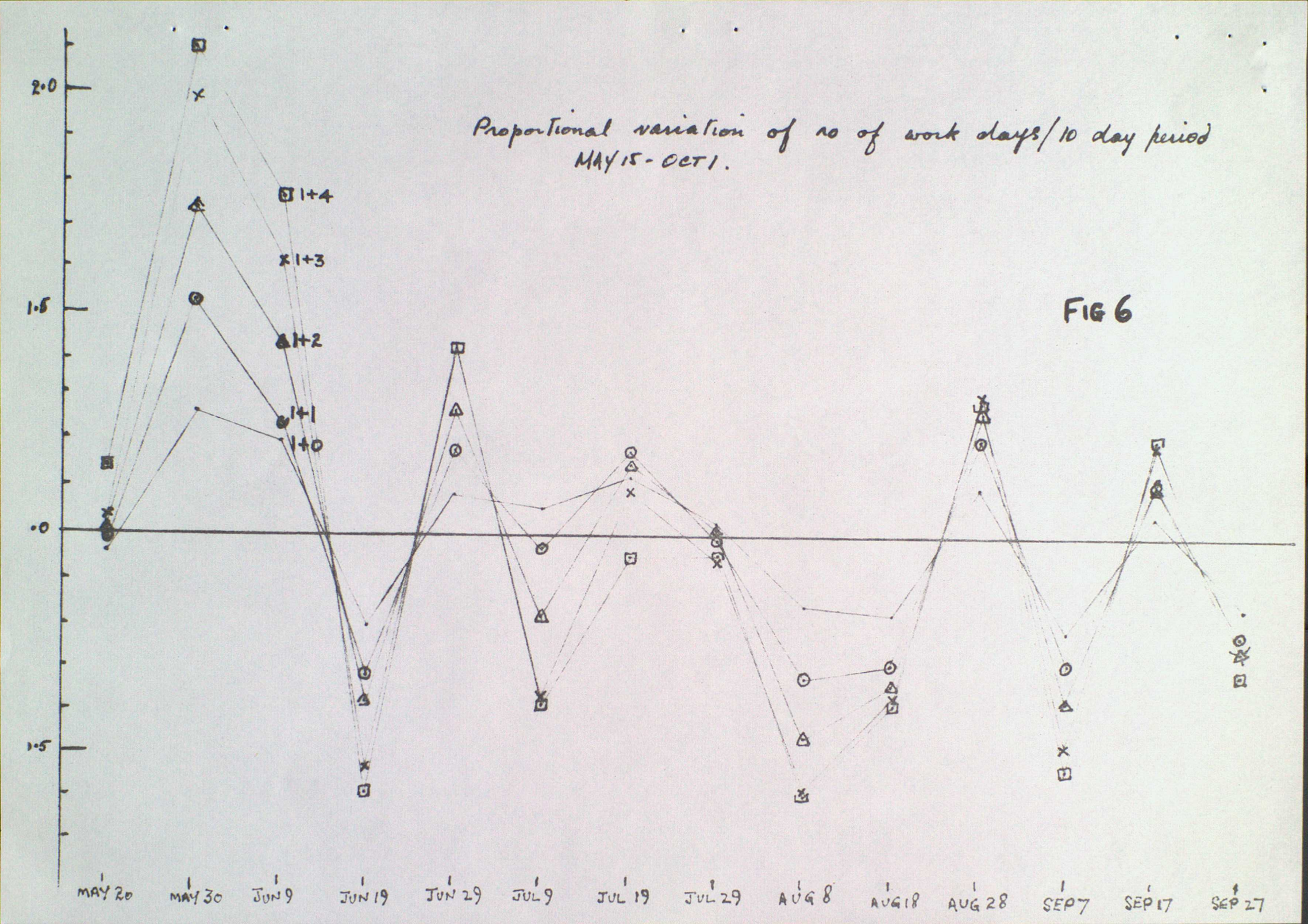


FIG 5


Proportional variation of no of work days/10 day period
MAY 15 - OCT 1.
FIG 6
2·0
1·5
·0
1·5
1+4
1+3
1+2
1+1
1+0
MAY 20
MAY 30
JUN 9
JUN 19
JUN 29
JUL 9
JUL 19
JUL 29
AUG 8
AUG 18
AUG 28
SEP 7
SEP 17
SEP 27

Average no. of years when 1 or more work day/10 day period

FIG 7

Average no. of years when 1 or more "1+1" work day /10 day period

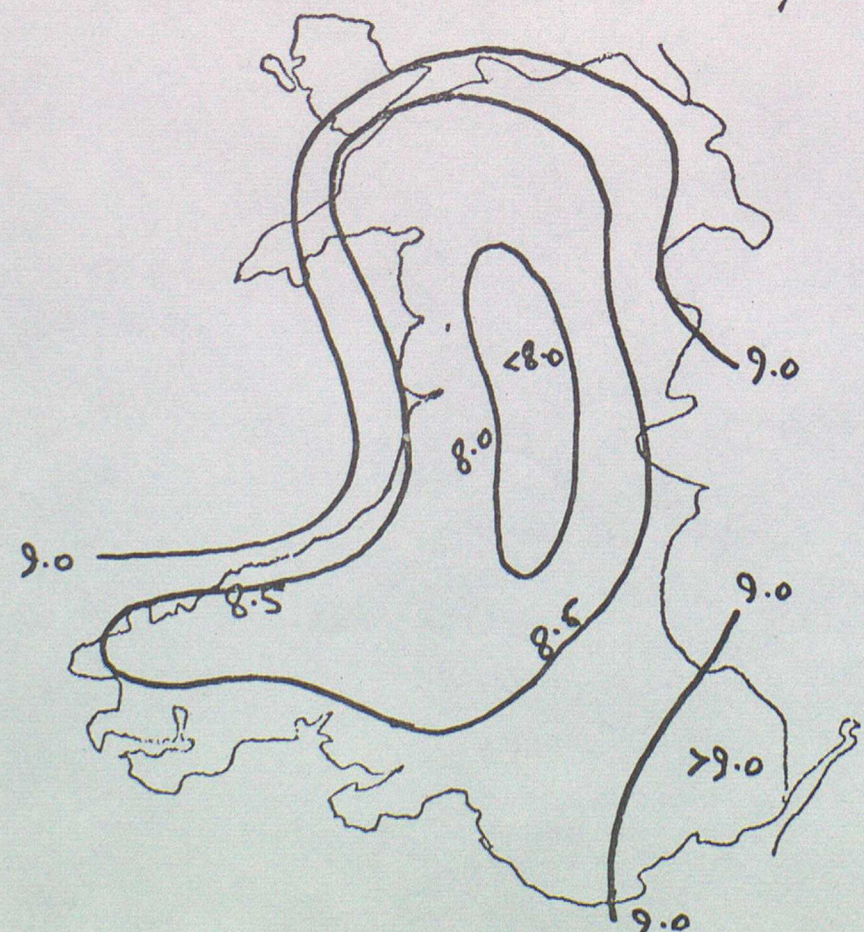


FIG 8

Average no. of years when 1 or more 1+2" work day /10 day period

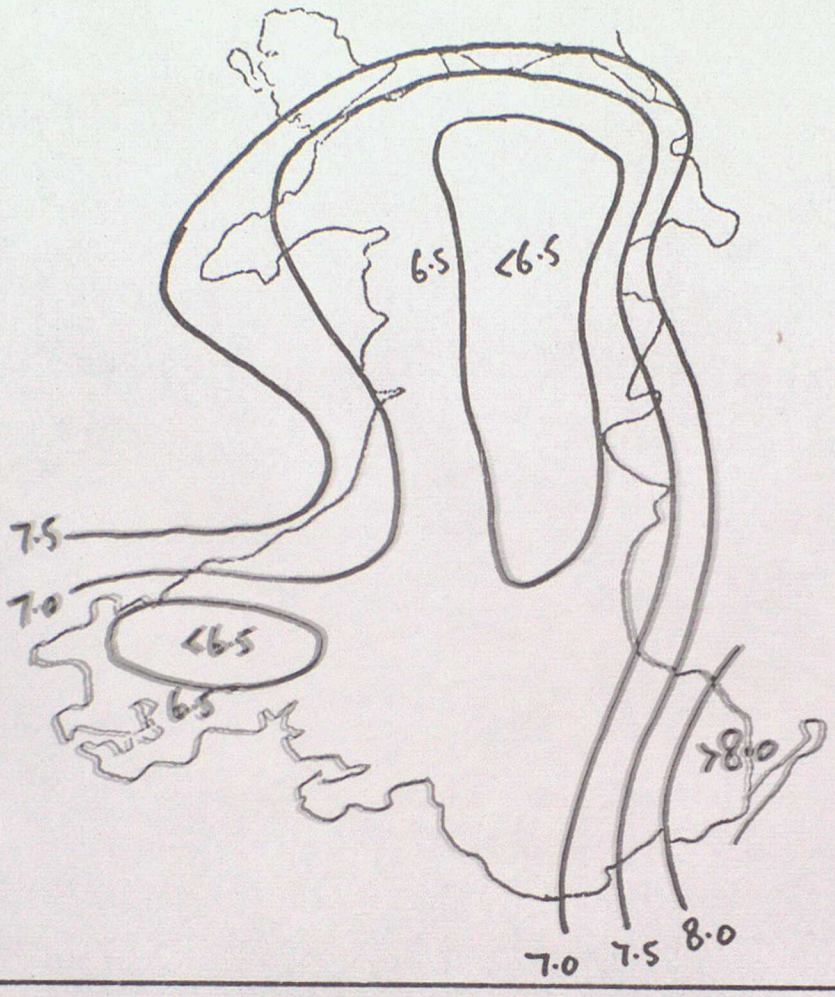


FIG 9

Average no. of years when 1 or more "1+3" work day /10 day period.

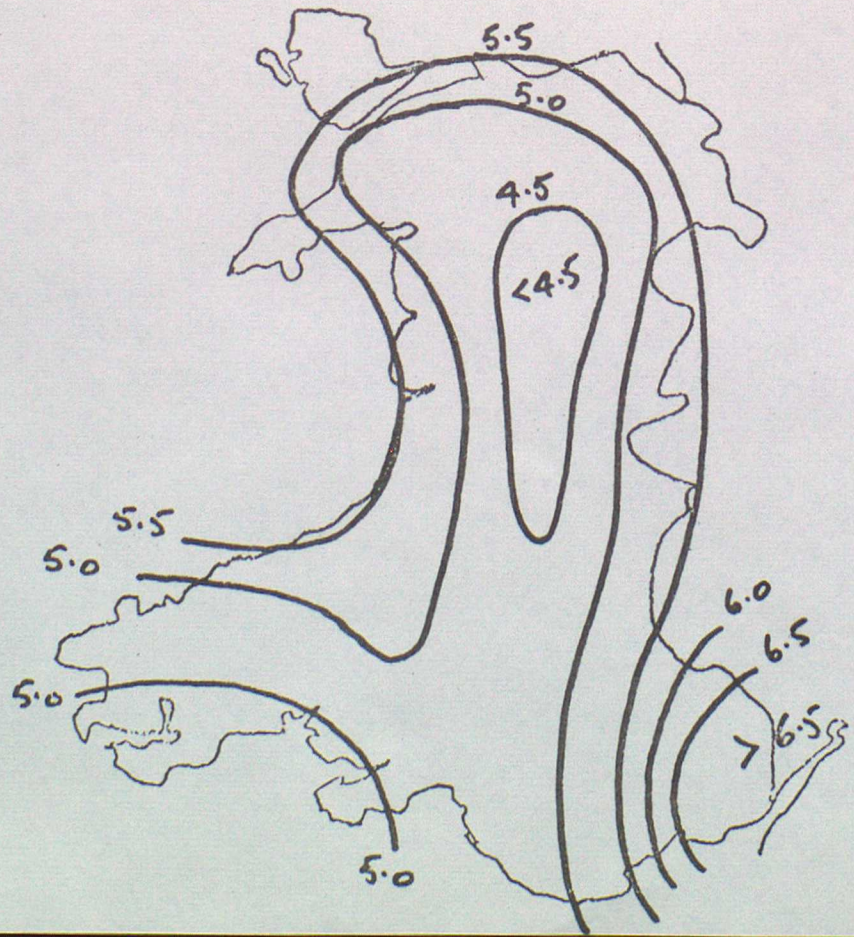


FIG 10

Average no. of years when 1 or more "1+4" work days /10 day period.

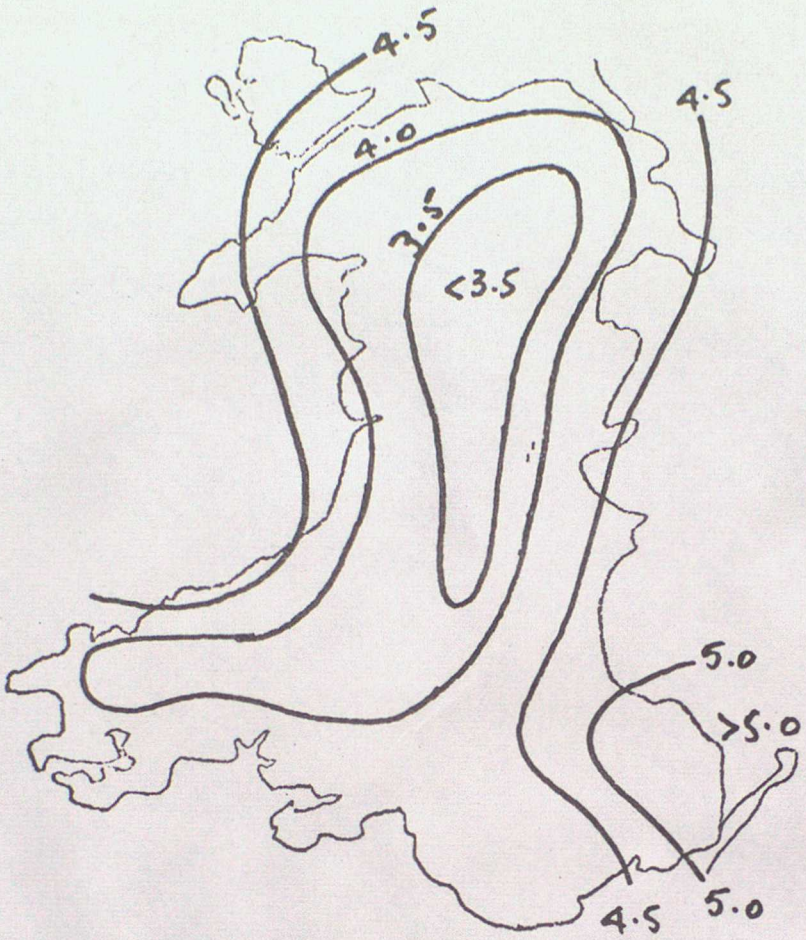


FIG 11.

Proportional variation of no. of years in 10 for which there is one or more work day / 10 day period.
MAY 15 – OCT 1.

FIG 12